

A step towards sustainable development in higher education in India by implementing new media technologies

A paperless approach

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Abstract

Purpose – The purpose of this paper is to focus on changing the dynamics of higher education in the Indian education system toward a paperless approach by implementing new media technologies.

Design/methodology/approach – The review paper highlights the need for sustainable development in higher education by using new media technologies by providing them with some real-time examples used in universities. This paper also highlights a different step toward the paperless approach in various universities in India. This paper draws the analysis based on the recent review of the literature as well as experience at the professional level.

Findings – The author discusses how the implementation of different new media technologies is helping universities in shifting toward a paperless approach for sustainable development and concern toward the environmental threat. To support the evidence, the authors have given some real-time examples through data collection and observations of various uses of new media technologies among private universities.

Originality/value – This paper provides an overview of various new media technologies and blends the critical issues of how technologies are changing the educational dimension toward a paperless approach among public and private universities in India. The paper also proposes to create a sustainable model by addressing the challenges by which the universities can support themselves and others.

Keywords Sustainable development, New media technologies, Higher education, Emerging technologies, Education, Paperless approach

Paper type Literature review

Introduction

A famous quote by Ban-ki-Moon states that “Sustainable development is the pathway to the future we want for all. It offers a framework to generate economic growth, achieve social justice, exercise environmental stewardship and strengthen governance.” Walker and Phillips (2008) have listed some primary social drives for sustainable development. The pathways of these drivers include social structures, institutions, different agencies and social norms and values. Every country in the world is taking some wise steps to deliver development prospects which include material well-being, good health, quality education and assessment of various goods. According to Venkataraman (2009), the objectives are listed as reestablishing learning and education, so that everyone has the opportunity to obtain the skills, values and knowledge that enable them for a sustainable future ahead and reinforcement education to learn in all areas, programs and activities that promote sustainable developments.

Many government and private universities in India have started implementing various systems and methods toward a paperless approach toward sustainable development.



Education was considered one of the most emerging and driving sectors for development in India. Right from childhood, every parent wants their child to learn in a reasonable and better school, later in a good university.

Many universities in India are building fairer and sustainable aspects, so that they can foster economic challenges of the twenty-first century. For this different, private universities are adopting different approaches as useful tools for sustainable development. Implementing different innovative learning technologies, learner-centric approaches which help in teaching and learning through new dimensions are essential for sustainable development. Sustainability promotes learning beyond the boundaries of many emerging and existing universities. According to Kiran Banga Chhokar (2010), many leading universities have started implementing the various policies toward the environment and sustainable education. He also emphasized efforts being used by different universities to engage at different educational levels through campus practices and student-led projects. Many universities are using different new media technologies which will foster development. This paper illustrates the use of different emerging new media technologies among various private universities in India, which helps in sustainable development that can lead toward a paperless approach.

Statistics about paper usage

The chamber thesaurus (Seaton *et al.*, 1990) defined paper as a certificate, document, file, gazette, journal, newspaper, letter, record, script, thesis and so on. In the internet era, paper is referred to as the compound document that combines text, digital, video and audio as the virtual document (Lund, 1994). Paper is considered to be one of the critical aspects of present-day life. Initially, the purpose of the paper was to transfer information to people. It is estimated that over the last 40 years, the worldwide consumption of paper has risen by 400 percent out of which 35 percent of harvested trees are used for paper manufacturing products (Orantes-Jimenez *et al.*, 2015). In the year 2014, the global production of paper and cupboard was approximately 407m metric tons (John Laporte, 2015). Presently, three countries, i.e. China, the USA and Japan, are largest paper producing countries in the world.

Jeff Segarra (2017) listed that major sectors, i.e. education, healthcare and legal industries, are some of the critical sectors in consumption of paper. Negi and Sharma (2018) recorded that the Indian paper industry is poised to grow up to 25m tons in the year 2019–2020 from 20.37 tons in the year 2017–2018. Education was considered one of the key sectors in India. An article in business studies 2014 states that India's demand for paper is 53 percent in the next six years, primarily due to the increase in the student enrollment in schools, colleges and universities. Many public and private universities are implementing different new media technologies to sustain and minimize paper usage.

New media technologies

To decrease paper consumption, many administrators in many universities are implementing different emerging new media technologies. Lev Manovich (2002) defined new media as a means of mass communication using various digital technologies. The definition of new media is related to the internet. Johnson *et al.* (2016) listed various new media technologies implemented by various universities. These technologies are classified into seven categories as consumer technologies, enabling technologies, internet technologies, learning technologies, social media technologies, visualization technologies and digital strategies. The paper describes some of these technologies with review of literature and through real-time examples which help in the paperless approach.

Methodology

This paper emphasizes on a knowledge built with literature review and examples. All the articles are peer-reviewed. The study is also based on a pilot study for the implementation of technologies toward paperless approach. The authors have limited the scope of this paper to only few technologies.

Implementation of the technologies for paperless approach

Many private universities in India are adopting and implementing these new media technologies to reduce the consumption of paper and turning offices into a paperless approach. The researcher has focused on the observations which are as follows.

Use of biometric systems

This is one of the most prominent steps taken by Government of India to convert muster attendance into the biometric attendance system of the employees. Many private and public sectors have started installing biometric technology to keep regular check on the employees.

Mangalore University in Karnataka state has installed biometric systems. This has not only reduced paper attendance but also has seen improvement in some other factors. The factors include punctuality of the teaching and non-teaching staff, reduction of fake attendance and maintenance of documents.

The study was carried out for a period of six months. The sample size included 350 employees which comprised of both teaching and non-teaching staff. Method for collection of data was:

- (1) convenience sample method (as a sample); and
- (2) structured interview method (as a tool).

The data on paper usage, collected from the purchasing department, issued various paper-related materials to all the departments. After the implementation, the total usage of the paper reduced drastically to 40 percent. As a result, 90 percent of the staff and faculty members started coming to the university at regular timings.

Converting libraries into digital libraries

The method of converting libraries into digital libraries was one of the significant steps toward sustainable development. According to Purdue Research Foundation & US EPA, every year nearly around 2bn books, 24bn newspapers and 359m magazines are published. Many universities around the world are taking adequate measures to minimize the usage of paper. Department of Higher Education, India (2016) in its report had launched National Mission on Education through Information and Communication Technology, discussed some of the achievements concerning higher education. One such achievement was the National Digital Library, to convert all the libraries into digital ones. Till the year 2016, there were nearly 6,423,000 resources available in the library. The primary objective of this mission was to reduce paper usage, availability and affordable to all the students. Kanta Kapoor (2010) in her research explored that Guru Gobind Singh Indraprastha University Library had introduced digital journals which reduced the paper consumption and the duplicity of various books. This development not only saved the paper usage but also increased the availability of journals throughout the years and, moreover, these journals are easily affordable by everybody.

Indian Institute of Technology Kharagpur had started three significant steps to reduce paper wastage: first, introduction of book scanning technology, scanning of all the books into the digital version, which can easily be shared with the students and faculty anytime and anywhere. Second, scanning to mobile technology, which is one of the alternatives to

the outdated scanning services; and third, cloud technology, which offers the alternative way for distributing same information to multiple people without wasting paper and toner. Findings collected from the library at IIT Kharagpur illustrated that the price of toner usage has reduced to 40 percent after the implementation of cloud technology and scanning technology. Iqbal and Ahmed (2015) studied that Lamar University in the USA had a 51.2 percent reduction in printing and copier machine usage costs after the implementation of the scanning technology.

Implementation of electronic tablets as a mode of examination

The examination is considered to be as one of the essential tools for assessment of the students' performance in universities. Over the years, composing of the examination papers is done manually. With the development of the internet and its applications, a variety of paperless examination based on the computer examination systems is becoming a reality. Over the years, the primary objective of the paperless examination is to replace the traditional paper (Liu and Ren, 2007). Many universities around the world have started switching the examination into a paperless approach. In India, some of the universities are using paperless examination by switching over to the computer-based examination.

Manipal Academy of Higher education, Karnataka implemented e tablets for writing examinations (Gyanesh, 2017). This digital initiative helped the university to save nearly around 30 lakh usage of papers in the examination every year, which is a vital step toward sustainable development and environment friendliness. The initiative not only reduced paper consumption but also improved the appropriate assessment of examination for the faculty.

Digital pads used to learn design courses in the fields of architecture and design

The value of design is considered to be one of the vital components of economic development of any country. Traditionally, the practice of design was one of old age in India. India is considered to be one of the countries rich in culture and craft tradition with its traditions and crafts. Design education was considered to be one of the most emerging sectors in India. Many public and private universities have started many design programs to fulfill this gap. There are around 33.27m students enrolled in the Indian higher education system (Duraismy, 2015). Out of which, nearly 1m students enrolled in various design courses (Gemmell and Vyas, 2016). By the year 2030, 40 percent more students will enroll in these courses.

The design programs itself uses much paper. The researcher had conducted an initial pilot study of 200 students in various design institutes in the Jaipur City of India. A semi-structured questionnaire consisting of the 15 questions asked to respondents that are related to the usage of paper, used for design. In total, 80 percent of the architecture and design students use paper effectively for their assignment. Approximately, 6 kg of paper was used by the students to learn design courses every year which is nearly around 1,200 kg per year for 200 students. Based on the results, the researcher initiated digital pad technology to teach some of the courses for six months. After six months of experimentation, the results showed that consumption of paper usage in drawing-related courses had reduced up to 50 percent. The results also showed that students are more engaged and actively participated in learning.

Paperless documentation by implementation radio frequency identification in libraries

Radio frequency technology is one of the oldest technologies that use radio waves to identify individual items automatically. Margam Madhusudhan (2010) emphasized to RFID technology be one of the fast-growing technologies for accessing library services and security in many ways. He also focused on various advantages, which are, first, RFID reduces the amount of time for performing different calculations. Second, RFID has

improved the efficiency of documentation at various checks in and check out points easily. Emmett Erwin and Christian Kern (2005) illustrated that the system had reduced the use of paper for documentation as RFID uses self-check unit for reading, putting and registering of particular books. RFID reduced the material cost and handling for only one label instead of two or three.

Nagalakshmi and Trivedi (2014) surveyed 41 institutions which included 3 deemed universities, 17 government institutions, 14 government universities and 7 self-finance universities. They observed that RFID had reduced the paper usage cost by 75.6 percent and also reduced the operating cost and labor cost by 30 percent. Presently, many leading universities in India have started implementing RFID in the libraries. Indian Institutes of Technology are one of the autonomous public institutions in India, Indian Institute of Technology – Delhi has recently implemented the RFID technology in the library for the smooth operation of library resources. Gupta and Margam (2016) observed that this technology is used in many areas like issuing and returning of the books, as 68 percent believed that RFID system had increased the affordability of books by using smart cards through an issue and return kiosks. More research has to be conducted about the usage of this technology in many universities.

Taking notes using mobile devices and tablets in the classroom

This technology is one of the accessible technologies used by the students in classrooms. Learning through mobile uses different technological devices like mobile devices, tablets and laptops. A report on transforming learning through mlearning, Pandit *et al.* (2012) listed various advantages: first, full reachability; second, real-time access for taking notes in the classroom; third, customized notes; fourth, collaboration. In order to know whether paper usage has reduced after the implementation of mobile devices and tablets, the researcher had experimented for six months. A total of 100 students were provided mobile devices and tablets for over a period of six months:

H1. There is relationship between mobile phone and the reduction of paper usage.

To conduct this experiment, initially, students were encouraged to bring mobile phones and tablets into the classroom for six months for various purposes like taking notes, reading various materials in the classroom. A structured questionnaire of 20 questions was designed to know the perceptions of the students on the usage of the mobile phones over paper. The content was validated by referring an expert. The reliability was checked using Cronbach's α , which had the value of 0.7. The results showed that 78 percent of students prefer mobile phones compared to notebooks, as they felt that carrying a single device was easy compared to a set of notebooks. The researcher also observed that 76 percent of students felt comfortable using tablets in drawing-based assignments rather than carrying various types of papers. The experiment resulted in the reduction of paper usage to 70 percent after the implementation of mobile technology in the classroom teaching.

Conclusion and future research

The findings stated that the use of new media technologies has reduced the use of the paper to an extent. However, still many universities are facing challenges after implementing these technologies in higher education. Some of the universities, like Rajasthan University, are facing the financial crisis for implementing of the biometric system (*The Times of India*, 2017).

Another major crunch with this system, financial feasibility as the university is facing deficits of Rs 70–80 crores annually. Converting to digital libraries was one of the biggest challenges in higher education in India. Ghosh (2005) listed various challenges faced by the universities for the development of digital libraries which were as follows: lack of support from parental organization, copywriting issues, financial support, lack of clear

policy at national level focusing mainly on sustainable development, lack of management support, and rigidity in the publishers' policies and data formats. For the online test for preparation industry, Sanjay (2015) listed some challenges like lack of awareness and access to different online tests, financial liability for converting the paper examinations to digital ones and faculty resistance to adapt. The paper proposes to create a sustainable model for converting to paperless approach by addressing the challenges by which universities can support themselves and others. It also proposes to have further research on the policy framework for sustainable development of each technology in detail for the paperless approach. The limitation is that only a few technologies and only a few universities have been covered for consideration.

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